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ABSTRACT

Part of a series of case studies on successful academic computing programs at minority institutions, this monograph focuses on the Community College of Baltimore (CCB). Sections I and II outline the purpose and background of the case study project, focusing on the 11 computing activities the case studies are designed to facilitate, the need for the project, and eight factors leading to the successful use of computers. Section III profiles CCB, describing its location, programs, mission, faculty, students, tuition and financial aid, accreditation, and budget. Section IV presents a chronology of CCB's computing activities from 1961 through 1981. The organization and management of CCB's computing activities are outlined in Section V, while Section VI describes the computer system, available software and courseware, system access and availability, and statistics on computer use. Section VII provides examples of the instructional and administrative applications of the computer at CCB, describing the activities of the computer and information systems department, the science learning center, and the dental and business departments, and briefly covering other activities and plans. Section VIII describes the students, faculty, and courses offered in the computer studies program, while Section IX examines computer literacy courses and seminars offered. Section X analyzes student benefits, Section XI outlines outreach activities, and the final sections offer advice from CCB computing staff and a list of contact persons. (KL)

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# Academic Computing at the Community College of Baltimore

## A Case Study

Beverly Hunter and Greg Kearsley

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1981

Human Resources Research Organization (HumRRO)
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# Foreword

This book was prepared by the Human Resources Research Organization and supported by the National Science Foundation, Minority Institutions Science Improvement Program, Grant Number SER-7914601. Beverly Hunter is Principal Investigator. All opinions, findings, and conclusions are those of the authors and do not necessarily reflect the view of the National Science Foundation.

Ms. Joyce Currie Little, former Chairperson of the Computer and Information Systems Department, and Ms. Elinor Heath, Director of Program Evaluation, gathered the information on computing activities at the Community College of Baltimore which is described in this book.

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# Academic Computing at the Community College of Baltimore

## A Case Study

# Purpose

This book is one of a series of case studies of academic computing at minority institutions. These case studies are intended to assist educators at such institutions perform the following activities:

- Identify academic computing needs.
- Establish realistic goals for instructional computing.
- Organize and staff a computer center.
- Select appropriate computer hardware and software.
- Make computer resources more accessible to students and staff.
- Extend computer applications in particular courses and disciplines.
- Establish or improve a computer science curriculum.
- Raise the general level of computer literacy on campus.
- Share facilities, expertise, or curricular materials within the college community or with other institutions.
- Make personal contacts with experts at other institutions.
- Prepare a (five year) plan for academic computing.

# Background

Computers and related technology provide important opportunities for minority institutions to help their historically disadvantaged students to become equal members of modern society. By using computer-based instruction, students can get individualized help in catching up on basic skills. By learning and applying computer-related skills, students strengthen their career potential.

Despite the clear advantages to minority institutions of employing computer technology, these institutions have in fact been slower to adopt the technologies than most majority institutions.

A number of studies[1,2] have examined the status and needs of academic computing at minority institutions. These studies suggest that while minority institutions are catching up to non-minority institutions in terms of computing facilities and activities, there are some significant inequities. For example, minority institutions are significantly lacking in computer science programs and the staff to provide them: in 1976/77, only 35 of 228 minority institutions had computer science programs.

Much of the progress made in academic computing at minority institutions during the past decade has been due to federal funding. Two programs in particular have been critical: ADIP (Advanced Institutional Development Program) of the Office of Education, HEW, and MISIP (Minority Institutions Science Improvement Program) of the National Science Foundation. The two programs have supported equipment acquisition, facilities, and curriculum development, as well as research projects.

A particularly valuable contribution to progress in minority computing was the ECMI (Educational Computing in Minority Institutions) funded by the National Science Foundation's Science Education Directorate. ECMI sponsored conferences and summer workshops which enabled 921 faculty and staff (including 56 presidents) to learn about and discuss the potentials of academic computing at minority institutions.

This case study project is an attempt to identify some minority institutions which demonstrate elements of successful academic computing.

[1] Lewis, J., et al. Computing in minority institutions: 1976/77. *The fourth inventory of computers in higher education.* Praeger, Colo., 1980.

[2] Marshall, P. *Instructional computing in minority institutions: a needs/strategy assessment* (Final Report). NSF Grant 7821515, 1979.

These case studies are intended to help the administrators, faculty, and staff of other minority institutions to plan and implement successful computing projects, building on the experiences of these case study institutions.

The minority institutions selected for these case studies include Jackson State University, Bennett College, Community College of Baltimore, and Florida A&M University. While these institutions vary widely in size, environment, history and academic programs, they do share certain common missions and problems. The case studies address some of the problems and ways the institutions have attempted to overcome them.

The case study project and other studies of minority institutions[1], have identified the following key factors leading to successful use of computers to improve learning and teaching in minority institutions.

(1) Dedication on the part of key faculty and administrators.
(2) Support of top administration.
(3) Campus-wide planning—beyond walls of a single department.
(4) Ability to put together funds from various sources.
(5) Careful budgeting practices.
(6) Ability to learn from own or others' experiences.
(7) Desire to get as much mileage as possible from available resources.
(8) Innovative approaches and continued efforts towards solving the problem of acquiring adequate staff and faculty.

[1] Marshall, P. Academic computing: a sample of approaches in minority institutions. *Proceedings of the National Educational Computing Conference*, Iowa City, 1980.

# Profile

The Community College of Baltimore (originally Baltimore Junior College) was established in 1947 by the Department of Education of Baltimore City. It is a public, two-year college which grants the Associate in Arts degree and Certificates in specialized areas. The College has an open-door admissions policy and serves a diverse student body.

The College is one of 17 community colleges in the State of Maryland. Responsibility for the finances, property, programs, and personnel rests with a local board of trustees. The State has a master plan (updated each year) and the College establishes its own goals and objectives within that framework.

## LOCATION

The College has two campuses under one administrative structure. The older Liberty Campus (18 acres and four major buildings) is on the northwest side of Baltimore. The Harbor Campus (six acres and two major buildings) was opened in 1976 and is located in the midst of a major urban redevelopment project. In addition to the two main campuses, the College operates 20 centers throughout the city, as well as offering courses for credit via radio, T.V., and mail.

## PROGRAMS

Major college divisions include: humanities (art, music, English, speech, foreign languages); business, secretarial and computer sciences; health sciences (including nursing, health technology and dental auxiliaries); social and behavioral sciences (psychology, public safety, urban affairs); and sciences, mathematics, technologies and physical education. A program is available for students who wish to obtain their high school graduate equivalency diploma (GED). The Division of Continuing Education/Community Services offers credit and non-credit courses in a wide range of subjects.

## MISSION

The Community College of Baltimore serves a large population that has not traditionally had access to post-secondary education. The College is committed to improving the surrounding urban community, and to involving the members of that community in the affairs of the College. The institutional goals of the Community College of Baltimore address the needs of a city that shares many of the characteristics of the older cities of America's northeast and mid-west. Baltimore City, whose population includes a large proportion of blacks, lower-class and working-class whites, and the elderly, sits at the center of its metropolitan area, ringed by relatively younger and wealthier suburbs.

Historically, blacks in Baltimore have been limited in economic and educational opportunities. Work opportunities for black people are still far from adequate. To improve this condition is the challenge of the Community College of Baltimore and the City. The College emphasizes the special needs of its urban population in its career curricula, innovative programs, developmental studies, and methods of non-traditional instruction.

## FACULTY

During the 1980-81 academic year, the instructional faculty numbered 191 persons full time and 710 part time. About 27% of the full-time faculty are black. Approximately 80% of the full-time staff have graduate degrees; 66% have master's degrees, and 14% have doctoral degrees.

## STUDENTS

The Community College of Baltimore is the only community college in the City. More than 90% of its 11,000 students are city residents, most of these from the western and central sections of the city—areas made up primarily of low income, black communities. Because of its open-door admission policy, low-cost tuition and convenient location at two city campuses, CCB represents the most accessible and, in many cases, the only opportunity for post-secondary education.

The composition of the College's student body is constantly changing. During the past seven years, enrollment has increased by more than 30%. In 1965, the percentage of black students was approximately 5%. Black students now comprise over 67% of the total enrollment at CCB. Women now constitute over 67% of the total student population as compared to 49% six years ago.

The academic preparation of new students, as measured by standardized tests, has declined over the past six years. The composite mean American College Test (ACT) score has declined by 36%, and the College's own placement test mean for entering freshmen is now 52% below the national norm. Many of CCB's students need extensive remedial and developmental education, and the College is placing emphasis on testing, tutoring and developmental courses in order to improve its retention rate. By providing these students with the knowledge and skills they need to succeed in their studies and stay in college, CCB lays the groundwork for reaching its goals of providing vocational and liberal education.

Other characteristics of CCB's student population reflect demographic characteristics of the area surrounding the two campuses. The age range in the Fall of 1980 was 16-72, with the median age for men and women in the Day Division at roughly 21. In the Division of Continuing Education, the median age was 28. More than 60% of the College's students are 23 years old or older, with black women students comprising the largest single group. Although the vast majority of CCB students are U.S. citizens, enrollment of foreign students has increased from 73 in the Spring 1978 semester, to more than 300 in the Fall 1980 semester. The College has recently begun English language training programs for groups of refugees from Russia and Southeast Asia.

## TUITION AND FINANCIAL AID

In the 1980-81 academic year, tuition fees were $237.50 per semester for Baltimore City residents, $475 per semester for Maryland residents not in the city, and $900 per semester for out of state students.

At the Community College of Baltimore, more than 83% of the students have a family income below $7,500 per year. This statistic, more than any other, reveals the plight of the students CCB is trying to

serve. Beginning in fiscal year 1975, the College qualified for a waiver of its share of the matching funds required of educational institutions participating in the College Work-Study Program. In order to be eligible for this waiver, CCB had to demonstrate that at least 50% of its students have family incomes of less than $7,500. The fact that CCB has continued to qualify for this waiver indicates the dire financial straits of more than a majority of its students, at least 78% of whom receive assistance from the City Department of Social Services. Without financial assistance, the majority of CCB students could not attend college.

Statistics show how rapidly the College adapted to face the financial needs of its students. In 1973, only 330 students were served by need-based financial aid programs. Six years later, over 6,000 students were receiving aid. For the 1978-79 academic year, 4,500 students received more than $3 million in aid. Students at CCB have a deep, demonstrated need for financial assistance; the College recognizes the urgency with which these students must be prepared to take their rightful places as productive, working citizens.

## ACCREDITATION

The College is accredited by the Middle States Association of Colleges and Secondary Schools. The nursing, medical record, respiratory therapy, physical therapist assistant, dietetic technology, and dental programs are all accredited by their respective State and National associations. College graduates who have achieved the Associate of Arts degree are accepted into the third year of other colleges and universities.

## BUDGET

The general budget of the College for the fiscal year 1981 was approximately $13 million. The cost per Full Time Equivalent (FTE) student was about $2,000 in 1980.

The State provides about 43% of the operating cost funds for the College, with 32% provided by the city and 25% coming from student fees.

# Sixteen Years of Computing

The data processing curriculum provides the central focus and is the primary resource for academic computing at CCB.

The college has had a data processing curriculum since 1965, well before most other colleges. The ready job market for students with computer skills has provided a major impetus for a data processing curriculum.

At CCB, as at many minority institutions, the success of the computer program reflects, in large part, the Herculean efforts of a single person. At CCB this dedicated person is Joyce Currie Little, chairperson of the department for many years. Her efforts have been reinforced by a small but unusually stable and committed faculty.

The following chronology highlights some of the significant events that have led to the present state of academic computing at the Community College of Baltimore.

1961: Course in Fundamentals of Data Processing offered in evenings; Instructor Ed Coady from Social Security Administration.

1964: Joyce C. Little and Isadore Stein hired to establish a Data Processing curriculum. Joint effort of mathematics and business administration departments.

1965: Thirty-five students enrolled in Data Processing curriculum. Curriculum design was based ona 1963 report by the U.S. Office of Education and materials provided by Purdue University. Stein attends NSF Summer Institute in data processing for college teachers.

1966: Vocational grant from the State permits acquisition of an IBM 1620. Arrives on Valentine's day (becomes labor of love). Little attends NSF Summer Institute in Computer Science for College Math Teachers.

1967: Data Processing Department formally created with Little and Stein as co-directors. First students graduate from program with Associate degrees.

Computer utilization committee created by Vice President for Finance and Dean of Faculty to identify computer support needed for administrative applications.
Charles C. Mott hired as manager of computer services; specifications for new computer system developed.

1968: Univac 9200 acquired; administrative data center established.
Students run their own jobs.
Lab assistant given released time to act as a part-time academic computing coordinator.
Computer and Information Systems staff grows to three full-time members.

1969: Computer and Information Systems (CIS) Department formed.
About 200 people enrolled.

1970: Univac 9200 upgraded to Univac 9300. (5 year lease).
Computer Center becomes closed shop.
Fourth faculty member joins CIS department.

1972: Univac 9480 replaces 9300. Provided capability for on-line data entry and inquiry used for administrative work. Also provided COBOL, RPG, and FORTRAN compilers.

1975: Memory of 9480 upgraded (5 year lease renewed).
CIS department arranges for timesharing services.

1976: Access to 5 ports on HP 2000 at Essex Community College via 10 Decwriter terminals in CIS lab.
Approximately 400 majors enrolled in CIS Department.

Four CCB faculty attend workshop provided by ECMI (Educational Computing in Minority Institutions) sponsored by the National Science Foundation.

Transfer program in Computer Science approved by State Board for Community College.

1977: Five more ports to HP 2000 at Essex Community College added.

Nine CCB faculty and administration attend ECMI workshop.

1978: Switch to DEC 10 at John Hopkins University for Computer and Information Systems course in BASIC programming.

1979: Title VI Grant used to acquire 5 microcomputers.

AIDP (Title III) Grant awarded which allowed Director of Information Systems position to be created, later combined with manager of administrative computer services.

Joyce Little serves as academic computing coordinator.

First CIS laboratory courses taught at Harbor Campus.

1980: Jim Lennon named Director of Information Systems, Spring 1980.

A dual CPU HP 3000 system acquired using MISIP grant and college funds for use in Science Learning Center, Computer Information Systems department, and Computer Services department. New computer labs constructed at both Harbor and Liberty Campuses. More microcomputers acquired.

Tom Gemmill is appointed CIS department chairperson, Fall 1980.

1981: New terminals laboratory opened at Liberty Campus.

Fred Dumser named Acting Director, Information Systems.

IBM 1620 to be transferred to Smithsonian Museum of Science and Technology.

# Organization and Management

The organization and management of computing activities at CCB have undergone many changes since 1965. The original department of data processing had co-chairpersons: one responsible for the curriculum and the other for department administration. When the Univac 9200 was acquired in 1968, a manager of computer services, as well as a programmer and keypunch operator, were hired. The major responsibility of this manager was to oversee administrative data processing for the college.

Figure 1 illustrates the current management structure for the CCB computing facilities. Overall responsibility for management and allocation of CCB computer resources is assigned to the Director of Information Systems. The manager of academic computing at Liberty Campus supports the Science Learning Center. The chairperson of the Computer and Information Systems (CIS) department coordinates CIS computing activities at both campuses.

The Data Processing Users Committee, appointed by the College President, assists the Director. Its functions are to:

- Oversee the computer system
- Establish procedures for access to the system
- Recommend data processing policies
- Establish safeguards to maintain security and confidentiality of data
- Plan the budget for college computing facilities.

The Committee consists of:

- Chairperson, Computer and Information Systems Department
- Manager of Liberty Campus Center
- Manager of Harbor Campus Center
- Director of Institutional Research
- Director of Finance
- Registrar

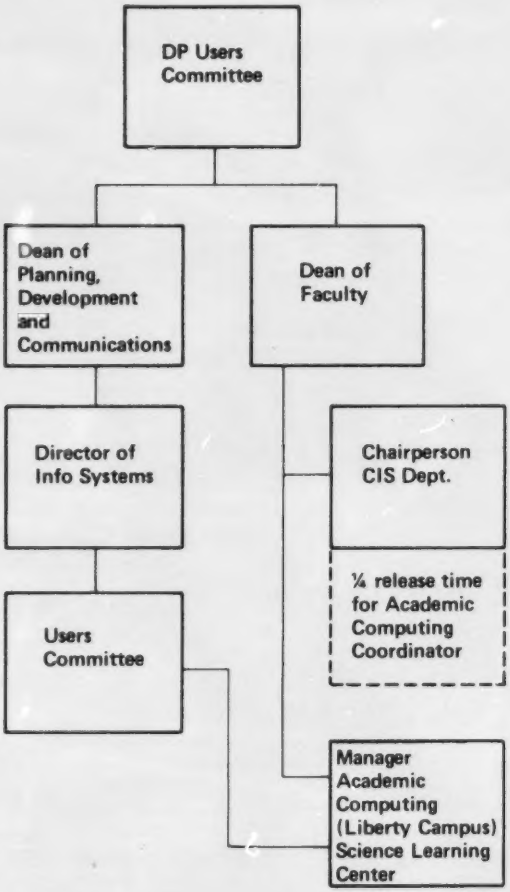
DP Users Committee
Dean of Planning, Development and Communications
Dean of Faculty
Director of Info Systems
Chairperson CIS Dept.
¼ release time for Academic Computing Coordinator
Users Committee
Manager Academic Computing (Liberty Campus) Science Learning Center

Figure 1 – **Management Structure of CCB Computing Resources**

## ACADEMIC COMPUTING COORDINATOR

A faculty member in the Computer and Information Systems (CIS) department is given about one-fourth released time to perform the role of academic computing coordinator for the college. The middle states accreditation committee has recommended that additional released time be gradually added until this becomes a full-time administrative position.

Academic computing support for departments outside of CIS has never been formally established or staffed, which has doubtless contributed to the lack of computer applications in the various disciplines. The newly established position of Manager of Academic Computing now supports the Science Learning Center and will eventually broaden its scope to support other disciplines.

## STAFFING

The Computer Services Department includes a director, one systems analyst, two analyst/programmers, two operators and three data entry clerks. The Library has one programmer.

The Science Learning Center has a full-time technician who operates and maintains equipment.

The Computer Information Systems laboratory employs students as part-time technicians. Finding qualified laboratory technicians has always been a problem. CCB shares with other two-year institutions the handicap of not having graduate students and upper-class students to serve as part-time technical support staff. Federal government work-study programs prohibit the use of students from nearby four-year colleges for this purpose.

## PLANNING AND PROCUREMENT PROCESSES

Through the efforts of dedicated faculty and staff members, the process of planning computer resources has been underway for several years.

In 1975, in an effort to acquire timesharing for CIS students, CCB requested funds for a minicomputer for instruction. This request was

denied by the city, with the suggestion that new hardware be procured in the Computer Services Department which could provide that service. Due to prior contractual arrangements, this was delayed until 1980. Leased off-campus services were used in the interim.

In 1976, an Ad Hoc Committee for the Investigation of Funding for the Improvement of Instruction was established, co-chaired by Ms. Joyce Little and Mr. John Bird. The Committee examined the potential of computer technology at the College. Its report identified sources of funding and applications for computers at the College. Particular emphasis was placed on the role of computers in improving the basic skills instruction of students. However, the Committee concluded that computers alone are not the solution. A plan was recommended that would (a) place students into small discipline-based work groups, (b) use "human potential" seminar types of activities to develop awareness of skills, abilities, etc., (c) encourage use of computer-assisted instruction (CAI) as an aid to their remediation needs, along with one human coordinator guide, and (d) encourage discipline-based CAI to support their regular class activities.

The Committee did help create an awareness of some alternatives for action, and many of its ideas were used as contributions to the Title III grant development. The faculty was encouraged to seek additional grant funds.

In 1977, Dr. Gerald Engel was hired as consultant to assess the status of CCB's computing efforts and provide recommendations for future development. Among Dr. Engel's recommendations were that both campuses be provided with equal computing faculty, that a director of Management Information Systems be created, and that a laboratory environment be created for Computer and Information Systems courses. In addition, Dr. Engel recommended that a Request for Proposals be developed in order to procure more suitable hardware for the college. All of these recommendations were subsequently followed.

In 1978, Mr. Wayne Heckrotte (a CCB graduate) was hired as a consultant to assist the Computer Task Force in identifying appropriate hardware configurations for CCB. Mr. Heckrotte's report considered various alternative configurations and was the basis for the design in the Request for Proposals of the new system.

In 1979, with the promise of Title III aid and Mr. Fred D[illegible]nser's Minority Institution's Science Improvement Program (MISIP) g[illegible]nt funds,

procurement of a dedicated academic machine finally became possible. A Request for Proposal (RFP) was prepared for a two machine system. The RFP described the current computer applications at CCB, specified the requirements for the proposed system, and stipulated the performance characteristics desired. The RFP included a technical questionnaire which vendors were required to complete as part of their proposals.

## COSTS AND BUDGETS

The budgeted funds for computer operations in FY '81 are approximately 5% of the total college budget. They include:

- $200,000 — salaries of computer personnel
- $150,000 — annual lease of equipment (5 year lease)
- $ 21,000 — software and supplies
- $ 15,000 — consultation, training services

The HP 3000 computer configuration at Liberty Campus has a total purchase price of $125,500. The equipment at the Harbor Campus has a total value of $390,000.

The Univac 9480 system which provided the college with administrative computing capability prior to the HP 3000 system was leased at a cost of approximately $130,000 annually. The timesharing services used by the Computer and Information Systems department cost $15,000-$18,600 per year for use of 10 terminals.

Some of the budget funds for computing in FY 1981 and '82 are derived from federal grants:

- Advanced Institutional Development Program (AIDP)
- Minority Institution's Science Improvement Program (MISIP)

# Access to Computer Resources

This chapter describes the resources that enable students, staff and faculty to use computing in their learning, teaching, research or administrative activities. A user's access to computing is influenced not only by the type and amount of computing equipment available, but also by the policies on user access, priority given to instructional uses, the availability of appropriate software for their applications, documentation to help the user, and availability of technical assistance.

## COMPUTER SYSTEM

A new computer system was installed at CCB in the Fall of 1980, replacing the previous Univac system. It consists of two HP-3000 series 33 computers, each with one megabyte of internal memory. One machine is located on each campus. The configuration at Harbor Campus includes four disc drives with a storage capacity of 120 megabytes each, three 1600 BPI tape drives, a card reader/punch, line printer, and mark-sense reader. The Liberty Campus configuration includes one disk drive (50 megabytes), one 800 BPI drive, a line printer, and mark-sense reader.

Figure 2 shows a schematic of the CCB computer network. The two computers communicate via a high-speed leased line and intelligent network processors resident in each machine.

Administrative computing is done on the Harbor Campus machine but Liberty Campus users access it through the Liberty computer. Academic computing is done on both computers. The Harbor Campus computer, together with the Computer and Information Systems department, is in the Lockwood Building; the Liberty Campus computer is on the floor below the Science Learning Center. A total of 70 devices are planned to have access.

Harbor Campus

| | |
|---|---|
| 5 Decwriters | CIS Lab |
| 4 Apple Microcomputers | CIS Lab |
| 1 TRS-80 Microcomputer | CIS Lab |
| 20 HP 2645's | Administrative Use |

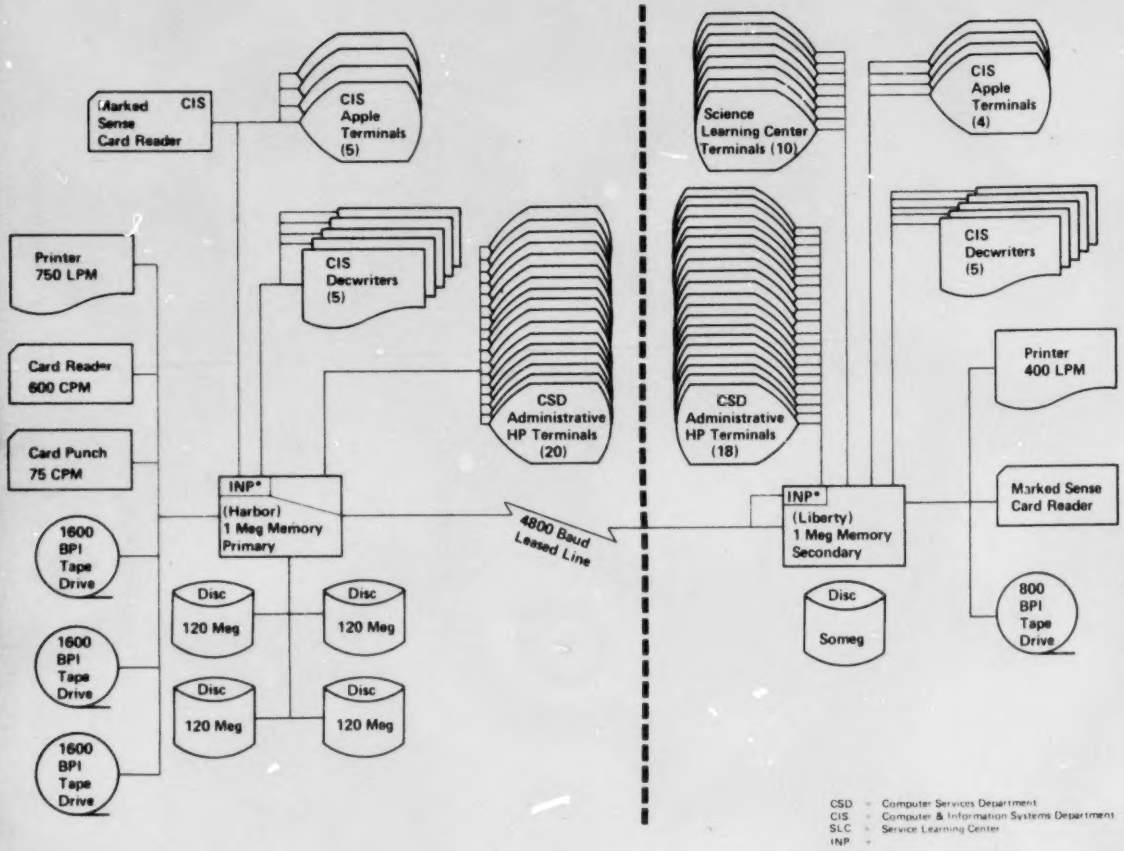


Figure 2 – **Community College of Baltimore Computer System**

Liberty Campus

| | |
|---|---|
| 5 Decwriters | CIS Lab |
| 1 Digilog Terminal | CIS Lab |
| 4 Apple Microcomputers | CIS Lab |
| 1 Apple Microcomputer | Science Learning Center |
| 10 HP 2645's | Science Learning Center |
| 1 Decwriter | Science Learning Center |
| 17 HP 2645's | Administrative Use |
| 1 HP 2645 | Dental Hygiene Clinic |

## SOFTWARE/COURSEWARE

The system uses the Hewlett-Packard MPE III operating system and the Image/3000 data base management system. The computer languages available include: COBOL, BASIC, RPG, FORTRAN, and ASSEMBLER. Statistical Programs for the Social Sciences (SPSS) is used for statistical applications. The SCHOLAR administrative system is used for student records processing.

The only externally obtained courseware available on the system are the Huntington simulations. All of the other courseware used in the Science Learning Center has been internally developed. IDF, an authoring system provided by Hewlett-Packard, has been used for courseware development.

## SYSTEM ACCESS AND AVAILABILITY

The system currently runs with a completely open usage priority scheme, i.e., first come, first served. There is an authorization scheme which controls access to administrative data bases. There is little conflict between administrative and academic computing. The academic users already need more disc storage capacity.

The system is available for use between 8:30am and 9:30pm, Monday thru Friday, and on weekends at the end of terms. The Computer and Information Systems terminal rooms are open whenever classes are in session. The Science Learning Center is open from 8:00am to 7:00pm, Monday, Tuesday and Wednesday, 8:00am to 4:40pm, Thursday and Friday, and 9:00am to 2:00pm on Saturdays.

## USE

Statistics on computer use for 1979-80 are shown in Figure 3 (Computer Services Department), Figure 4 (Computer and Information Systems Department), and Figure 5 (Science Learning Center).

Different usage patterns exist for educational (Computer and Information Systems) and academic/administrative (Computer Services Department) activities. Administrative requirements are heaviest during the several weeks preceding and following the beginning and ending of each semester. Student uses are heaviest beginning about the third week of each semester until the beginning of the last week. Workloads typical of peak usage prior to the installation of the new system were:

- 500,000 print lines per 12-hour shift
- 60,000 punched cards per 8-hour shift
- 432,000 cards read per 8-hour shift
- 200 megabytes of on-line storage in use

In the fall of 1978, the total usage on the Computer and Information Systems (CIS) time-shared services amounted to 1,453 hours across six courses. In the 1979 spring term, the total usage was 1,824 hours.

In 1980, there were approximately 540 compilations per week (all languages) and approximately 3,000 on-line transactions per week (45,000 per semester). It was anticipated that the volume of on-line transactions would eventually increase by a factor of 4-6 times with the current HP system.

In CIS lab classes, there are approximately two students to a station in BASIC and FORTRAN, four students to a station in the microcomputer course, and four students to a keypunch in COBOL and RPG.

| Major Support Area Grouping | Application Programs in Support of | | | Average Lines of Code | Batch Jobs Average/Per Month | | On-Line Transactions Number of Transmissions | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Liberty Campus | | Harbor Campus | |
| | Batch | On-Line | Language | | Current | Anticipated | Current | Anticipated | Current | Anticipated |
| CIS DEPT. | | | ALL | | 2,400 | 2,000 | Used Timesharing Services From Johns Hopkins University. | | | |
| Misc. Academic | | | | | 25 | 50 | | | | |
| Student Personnel Records | 63 | 15 | COBOL | 2,100 | 50 | 30 | 3,000 | 12,000 | 2,000 | 6,000 |
| Financial Aid | 13 | 5 | COBOL | 2,200 | 50 | 75 | 6,000 | 8,000 | 2,000 | 3,000 |
| Finance/Cashier | 18 | 7 | COBOL | 2,000 | 5 | 20 | -- | 6,000 | -- | 4,000 |
| Institutional Research | 28 | -- | COBOL | 2,200 | 15 | 40 | -- | 7,000 | -- | -- |
| Dean of Faculty | 15 | -- | COBOL/RPG | 1,900 | 5 | 15 | -- | 4,000 | -- | 2,000 |
| Libraries | 42 | -- | COBOL | 1,500 | 70 | 100 | -- | -- | -- | -- |
| Misc. Administrative | 48 | -- | MIXED COBOL/ASMB | 1,500 | 20 | 60 | -- | -- | -- | -- |
| Master Scheduling | 15 | -- | COBOL | 2,100 | 60 | 20 | -- | 3,000 | -- | -- |
| Registration | -- | -- | -- | -- | 30 | 5 | -- | 12,000 | -- | 6,000 |
| Payroll/Personnel | 26 | 7 | COBOL | 1,800 | 20 | 35 | 2 | 800 | -- | 600 |

Figure 3 – **Computer Services Department Usage: 1979 - 1980**

| Existing Courses Using Computers | Computer Language Used | Mode of Access | 1979 Equipment Used | 1980 Equipment Used | 79-80 Enrollments Average/Semester | | 80-81 Expected Enrollments Average/Semester | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Liberty | Harbor | Liberty | Harbor |
| CIS 100 | BASIC | I | TSS | CCB | 180 | 50 | 100 | 180 |
| CIS 101 | Several | -- | -- | -- | 175 | 100 | 120 | 160 |
| CIS 103 | FORTRAN | B | CSD | CCB | 40 | 20 | 80 | 40 |
| CIS 106 | Assembler | C | IBM 1620 | Apple's, TRS-80 | 60 | 0 | 60 | 60 |
| CIS110 | Several | I | TSS,CSD | CCB | 20 | 0 | 50 | 50 |
| CIS 202-203 | COBOL | B | CSD | CCB | 40 | 0 | 0 | 50 |
| CIS 204-205 | RPG | B | CSD | CCB | 0 | 0 | 0 | 25 |
| CIS 206 | ALC | B | CSD | CCB | 0 | 0 | 20 | 0 |
| BA 217 | Several | M | TSS,CSD | CCB | 80 | 0 | 40 | 80 |

I = Interactive, on terminals; B = batch; C = console; M = usage

TSS = Timesharing service; 1978-79 usage averaged 1600 hours of terminal time per semester
CSD = Computer Services Department; 1978-79 usage in Appendix A-I
CCB = New CCB Computer

Figure 4 – **Computer and Information Systems Department Usage: 1979 - 80**

| | Year | Type of Usage** | Maximum Number Served | Number Likely Served | Average Time Per Use (In Hours) | Uses Per Student Per Week | Student Connect Hours | Number of Terminals |
|---|---|---|---|---|---|---|---|---|
| Liberty | 1 | 1,3,5 | 900 | 225 | 0.75 | 2 | 338 | 8 |
| | 2 | 1,5 | 900 | 360 | 0.75 | 2 | 540 | 12 |
| | 3 | 1,5 | 900 | 720 | 0.75 | 2 | 1,080 | 20 |
| Harbor | 1 | 0 | 0 | 0 | -- | -- | -- | -- |
| | 2 | 1,3 | 100 | 25 | 0.75 | 2 | 38 | 2 |
| | 3 | 1,3 | 100 | 50 | 0.75 | 2 | 75 | 3 |

*Projections made in 1979 for the following three academic years.
**Type 1: Computer Assisted Instruction (CAI)
Type 2: Computer Managed Instruction (CMI)
Type 3: Simulations
Type 4: Computer Literacy
Type 5: Evaluation of Instruction

Figure 5 – **Computer Use By Projected Science Learning Center***

# Spectrum of Applications

The CCB computer systems have been used for a wide range of instructional and administrative applications. These include student programming, student grading, computer-assisted instruction, question banks, library services, registration, statistical analysis, and budgeting. Examples of these applications are described in this section.

## COMPUTER AND INFORMATION SYSTEMS DEPARTMENT (CIS)

The CIS department offers programming courses in the BASIC, COBOL, RPG II, FORTRAN, and Assembler languages. Data files for testing class problems are maintained on the system as are several computer-assisted teaching programs. The CIS department uses timesharing terminals on the HP 3000 system, punch cards and a card reader, and microcomputers for its programming laboratories. The courses available are described in detail in the section, "Computer Science Program."

## SCIENCE LEARNING CENTER (SLC)

The objectives of the Science Learning Center (SLC) are to increase the number of students transferring from the college to four-year institutions as science majors and to increase interaction between science faculty and students.

The SLC provides multimedia learning experiences for CCB science students (biology, chemistry and physics). Because many CCB students have weak academic skills, traditional textbook/lecture methods are frequently inadequate. The purpose of the Science Learning Center is to remedy this situation.

The Science Learning Center serves about 425 students per week, averaging 3.5 hours per student. The center has 20 carrels equipped with video and computer terminals. The computer is used to provide simulations, deliver information in a controlled fashion, and to test mastery of concepts learned from other media.

Most of the instruction is designed to supplement regular classes and materials. The exceptions to this are two biology courses which were

**Computer and Information Systems (CIS) Laboratory (Liberty Campus)**

specifically designed for the SLC. They involve lectures, small group meetings, and videotape lessons done in the lab.

Fred Dumser, Director of the SLC, feels that one of the reasons for the success of the SLC is that all materials are directly related to course-work, rather than isolated units. Computer courseware obtained from other institutions has not proven very useful, since it does not directly relate to CCB courses. All of the existing computer materials have been developed by CCB faculty.

## DENTAL DEPARTMENT

Students in the Dental Hygiene Department perform diagnostic and preventive dentistry procedures on their patients. The many tasks associated with a visit are given weighted grades. A continuous flow of patient and student evaluation data are entered onto the system and subsequently

**Science Learning Center**
**(Liberty Campus)**

updated; Grades for each visit are calculated and a running detail and summary account is maintained for each student. Printouts are prepared several times during a semester; the final summaries are then used as the primary basis for the student's semester grade. Patient data are maintained primarily as an historical record.

## BUSINESS DEPARTMENT

The course, Introduction to Business (BA100), uses a computer simulation "game." Student teams begin the semester with pseudo business firms with a given level of assets and liabilities. Each week the teams make decisions regarding expenditures, sales, production, inventory, etc.

The decision sheets are submitted for processing against the most recent "condition" of the firm. The computer evaluates their decisions and prints out a new financial profile. The next cycle's decisions are then recorded on that document for subsequent submittal and processing.

The business department also offers a course, Fundamentals of Data Processing for Managers (BA217) which introduces managers to computing.

## TEST BANKS

On the Univac system, a test banking service was provided. Conversion to HP is in progress. Instructors submit their files of objective questions for entries and inclusion into a Question Bank File. They then request a test printout on the basis of an ordered listing of the test question numbers. The computer printed test is then used as a printer master copy. If requested, an item analysis of responses can be performed if the responses are entered into the system.

## MISCELLANEOUS

Frequent requests come from departments and directors for cumulative record information on selected groups of students being studied for some academic purpose. Similar requests for mailing labels for follow-up studies, student contact efforts, etc., are prepared from the same data base.

## LIBRARY

Library services used the Univac system to manage its collection and track borrowers. Conversion to HP is underway. The major files are: Shelflist File, Periodical File, Musical Records and Microfilm File, Library Cards Issued File. Reports are: Master Holdings Lists, Bibliography Listing, Acquisitions Lists, Periodical Bid List, Periodical Direct Order List, and Periodical Holdings Master List. Overdue mailer and reports are prepared twice a week for the Liberty Campus and once a week for the

Harbor Campus. Certified letters are prepared from the overdue file at the end of each semester.

## PLANS

The Computer and Information Systems department plans to provide instruction in PASCAL and would like to acquire more microcomputers for the labs.

The Science Learning Center would like released staff time to develop more Computer Assisted Instruction (CAI) curriculum. An authoring system is currently being prepared to facilitate courseware development. Additional capabilities desired are interactive video interfaces and computer graphics.

The college would like to have a computer-based vocational counseling system to provide students with job information and assistance.

## ADMINISTRATIVE APPLICATIONS

Administrative computing support is provided for the following:

Office of Finance
Office of Institutional Research
Student Services Division
Office of the Dean of Faculty
Financial Aid Office

# Computer Studies Program

The Computer and Information Systems Department (CIS) provides two-year Associate in Arts degree programs in Data Processing and in Computer Science. Students can combine their computer courses with business courses for Data Processing or with mathematics for Computer Science.

The Data Processing program emphasizes computer programming for business, industry, and government recordkeeping and information management. Graduates in Data Processing work as computer programmers in computer centers in banks, insurance companies, financial institutions and governments.

The Computer Science program prepares students to be computer programmers in medical research centers, laboratories and engineering companies. Another option for the Computer Science major is to prepare for transfer into a four-year college program. For this the student must master a variety of computer languages including assembler and mathematics, through advanced calculus and linear algebra, and laboratory sciences.

## STUDENTS

In the 1980-81 academic year, there were 430 CIS majors on two campuses. About half the enrollments are in evening courses. Twenty-five students were awarded degrees in Data Processing or Computer Science in the Spring of 1981. The number of student majors enrolled since 1968 is shown as Figure 6.

## FACULTY

In 1980-81 there were four full-time faculty positions, although one was vacant. Among majors, the student to faculty ratio is over 50 to 1, improved from 1977 when it was about 100 to 1. The middle states accreditation committee in 1979 recommended increasing full-time faculty to achieve a student/faculty ratio of 25 to 1. One additional full-time position was approved for 1981-82.

| YEAR | MAJORS |
|---|---|
| 1968 | 199 |
| 1970 | 219 |
| 1972 | 117 |
| 1974 | 154 |
| 1976 | 413 |
| 1978 | 285 |
| 1980 | 480 |

Figure 6 – # **CIS Majors, Fall Semesters**

## COURSES

All but six of the twenty-two courses offered teach programming. Courses are oriented towards the programming languages BASIC, FORTRAN, COBOL, RPG, microcomputer assembly language, and HP assembler. Other courses offered include the following:

Fundamentals of Data Processing
File Processing
Computers and Society
Computer Operations
Systems Analysis and Design
Processing Systems (introduction to systems programming)

A detailed syllabus is available for each course. Example syllabi for two of the courses are shown below.

## CIS 102. File Processing

This course introduces the student to common data structures and file organizations, and through laboratory work expands the student's understanding of data organization and representation. Students will study an operating system and its job control language in order to implement the preparation of data files, access and manipulation of these files, the usage of program library and utility routines, and the definition and usage of saved programs. An introduction to integrated data base systems will be presented providing students with a complete overview of all levels of data management.

### Objectives

Students who complete this course should be able to:

1. Explain the hierarchy of operation in which an input/output system functions.
2. Explain the interface design between the main storage of a computer and its input/output devices.
3. Distinguish between random and sequential storage.
4. Understand the organization of logical data files.
5. Understand basic file operations.
6. Define the operating system data management functions.
7. Understand the relationship of the access method to the application program and the input/output supervisor.
8. Understand the relationship of data sets, volume, libraries, catalogs and input/output.
9. Understand the concept of job control.
10. Understand the basic concepts of data base technology.
11. Understand the trends of information technology to provide immediate access to large integrated data files.

## CIS 106. Stored Programming Concepts for Microcomputers

This course covers computer concepts, internal data representation, and programming in Assembly Language for a small microcomputer. Emphasis is placed on writing and running computer programs in a hands-on laboratory environment. Students establish data and program areas in storage, and use processor instructions to perform calculations, input/output and data manipulation. Techniques include table lookup, indirect addressing, and subroutine linkage. Machine language is used to read storage dumps of the program and data areas.

### Objectives

The student who completes this course should be able to:

1. Master the fundamental instructions of a symbolic programming system, using a small hands-on microcomputer.
2. Be able to operate equipment for loading programs, for assembler compilation, and for use of the features for debugging.
3. Understand flowcharting symbols; use them in planning the logical design of a problem; apply them to proper documentation procedures.
4. Master these programming techniques: Beginning-of-job routines, trailer card tests for end-of-job routines, looping, initializing, incrementing, comparing and branching, housekeeping procedures, address modification and address computation, linkage, and table look-up.
5. Use declaratives and relative addressing for symbolic input/output field definition, and for establishing constants.
6. Understand the vocabulary of a computer environment: assembly language versus compiler language; source versus object program, diagnostic errors versus execution errors, etc.
7. Distinguish data and instruction formats for assembler language; be able to read a simple program.

8. Recognize the various types of problems in a business use of computers, with emphasis on some programming application such as payroll or inventory.
9. Be familiar with several simple applications such as simple or compound interest, payroll, vote-counting frequency distributions, averages, sales information with commissions or discounts, and department store accounts receivable.

# Computer Literacy

If students, staff and faculty are to benefit from computers in their learning, teaching, research and subsequent careers, they must acquire some basic computer skills, facts and concepts. This basic computer knowledge is often referred to as "computer literacy."

About 15% of CCB students use computers each year. Students can acquire computer literacy through three principal channels: taking courses in the Computer and Information Systems (CIS) department, taking one of the business courses using computers, or using computer-assisted instruction at the Science Learning Center.

## CIS Courses

About 25% of students in CIS courses are non-majors, from the fields of accounting, electronics and law enforcement. Four introductory courses are offered. The computing courses taken most often by non-majors are CIS 100 (Introduction to Computing with BASIC), and CIS 103 (Introduction to Computing with FORTRAN). Other non-majors take CIS 101 (Introduction to Data Processing) or CIS 110 (Computers and Society). Figure 7 shows enrollments in these courses.

| | Fall 1976 | Spring 1977 | Fall 1977 | Spring 1978 | Fall 1978 | Spring 1979 | Fall 1979 | Spring 1980 | Fall 1980 | Spring 1981 |
|---|---|---|---|---|---|---|---|---|---|---|
| CIS 100 | 119 | 133 | 164 | 110 | 129 | 157 | 212 | 200 | 297 | 214 |
| CIS 101 | 318 | 174 | 196 | 224 | 156 | 270 | 207 | 195 | 335 | 359 |
| CIS 103 | 64 | 35 | 25 | 42 | 46 | 32 | 50 | 44 | 24 | 47 |
| CIS 110 | -- | -- | 77 | -- | -- | -- | 26 | 21 | -- | -- |

Figure 7 – **Course Enrollments for CIS 100, 101, 103 and 110**

### CIS 100. Introduction to Computing with BASIC

This course introduces computers and computer programming by means of the BASIC computer language. Students use a variety of

program packages and games to learn operation of computer terminals and microcomputers, then to write their own programs. This course serves as an elementary first course in computer programming for CS majors and is open to students from other fields who are interested in interactive computer usage.

### Objectives

The student who successfully completes this course should be able to:

1. Understand the basic concepts of timesharing and remote access to a computer via telephone lines.
2. Document the flow of a simple applications problem in flowchart form.
3. Write simple computer programs using the BASIC programming language.
4. Understand and use simple program documentation in order to run and use previously prepared BASIC programs.
5. Understand BASIC concepts of programming for later use with other high-level languages.

### CIS 110. Computers and Society

This course is designed to provide a general introduction to computers, their uses, and their impact on society. Students have an opportunity to become more literate about computers in their daily lives, become more cognizant of the role computers play in maintaining our present level of technology, and become more aware of the potential problems caused by the misuse of the computers. Computer uses in fields such as education, business, transportation, medicine, and engineering are subjects for discussion, leading to analyses of issues such as privacy, unemployment and computer crime. Students will use the computer facility for doing classwork and will have several field trips.

## Objectives

The student should be able to:

1. Discuss the size and scope of the computer industry;
2. Describe the functional characteristics of computers;
3. Identify the characteristics and format of data, and give various ways to summarize and classify them;
4. Discuss the advantages, disadvantages, and relative costs of various data storage media;
5. Specify the job tasks to be done by various computer professionals;
6. Describe how the computer is used in several different fields;
7. Identify several of the changes ongoing in society due to the computer; and
8. Give the pros and cons of each of several issues in the computer field.

CIS Course enrollments by non-CIS majors are limited by several administrative factors. Sometimes offerings are reduced due to limited staff. Some courses require English prerequisites which are not met by many CCB students. Also, CIS courses are not allowed to count in the college's general education requirements.

## Seminars

Periodic seminars and short courses are provided for CCB staff and faculty. For example, an outline of a seminar held for science faculty, is shown in Figure 8. The Office of Staff Development has also offered a one-credit course on computer literacy for staff and faculty.

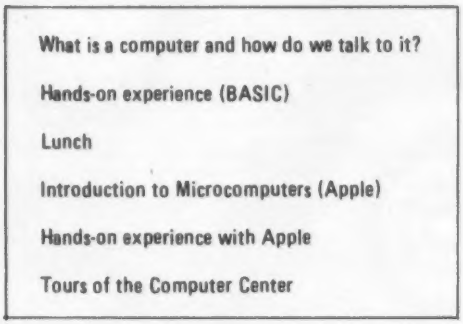
What is a computer and how do we talk to it?
Hands-on experience (BASIC)
Lunch
Introduction to Microcomputers (Apple)
Hands-on experience with Apple
Tours of the Computer Center

Figure 8 – **One-Day Computing Seminar For Science Faculty**

# Student Benefits

## COMPUTER AND INFORMATION SYSTEMS (CIS) GRADUATE PLACEMENT

Approximately 350 students have graduated from the CIS program since its inception.

A follow-up study of 1973-75 CIS graduates[1] in 1976, done by the Dean of Faculty's Office revealed that 90% of the graduates were employed in computer-related careers. Job titles included computer/peripheral equipment operator, programmer, system analyst, senior production schedules, information system specialist, Management Information Systems (MIS) supervisor, and manager. Analysis of salaries revealed that initial salaries increased regularly year by year from an entry level high of $10,500 in 1973, to $15,000 in 1975. Approximately 83% of the respondents were employed in the Baltimore metropolitan area, with 63% in Baltimore City. About 60% of the respondents stated that the associate degree was required or preferred for their employment. The majority of respondents (81%) indicated they were satisfied with their career preparation at CCB. Among the recommendations for improvement were: more emphasis on job control languages, more on-the-job work experience and more career counseling.

Dozens of alumni are working for the State of Maryland, and for Baltimore City. Other clusters of graduates are at Maryland Casualty Company, Monumental Life, Johns Hopkins Medical School, Union Trust Bank, PHH Group, and Social Security Administration (SSA). Some graduates have been hired by CCB, in the Computer Services Center, as well as in the Library.

Two alumni are Presidents of their own companies, about a dozen run their own businesses, and as many as forty work as managers of their company's computer centers.

Approximately a third are transferring to four-year programs, mostly at the University of Baltimore. Only a few have left the Baltimore area.

[1] Joyce Currie Little. Where are our students going? *Interface*, Winter 1980, 4, 14-18.

## AWARDS – DPMA OUTSTANDING FRESHMAN

Each year the Data Processing Management Association, Baltimore Chapter, awards $100 and a plaque to the outstanding freshman student. Candidates must be freshmen with a B+ average and be nominated by a faculty member. Finalists are interviewed by a committee of alumni, who vote on a winner. Four students have won these awards since 1978.

## SCIENCE LEARNING CENTER

There appear to be a number of student benefits due to the use of computers in the learning center. Students like to preview tests before they take them in class. The withdrawal rate is lower in computer-based courses suggesting that computer interaction makes the course more interesting. An additional benefit is that most of these students have never had any exposure to a computer before and this provides some "computer literacy."

# Outreach

## COMMUNITY SERVICE

Members of the Computer and Information Systems (CIS) faculty:

- Worked with Baltimore Polytechnic Institute (boys' public high school) to offer computer club activities, often using CCB equipment.
- Give career lectures in local public high schools.
- Give campus computer tours to local high schools.
- Serve on advisory committee for vocational education in data processing for Baltimore City Public Schools.
- Participate in local public demonstrations (e.g., fair, open house for potential students) with computer equipment.

## CIS ALUMNI MEETINGS

An annual meeting of CCB Computer and Information Systems (CIS) graduates is usually attended by about 40-50 graduates. This regular contact with graduates provides essential links to industry and government for staff and new graduates.

## PROFESSIONAL SOCIETIES

Computer and Information Systems faculty members contribute to national and regional professional societies in the computer science field.

- The entire CIS faculty attends the annual Spring Symposium of the Maryland Association for Educational Uses of Computers (MAEUC).
- Joyce Little has contributed to national curriculum and certification activities. She has served as: Chairperson of the Association for Computing Machinery (ACM); Community and Junior College Curriculum Committee; charter member of the Council for the Certificate in Computer Programming (CCP), administered by the Institute for Certification of

Computer Professionals; Board member of the Maryland Association for Educational Uses of Computing; Member of ACM and the Data Processing Management Association, and the Association for Educational Data Systems.

- Educational Computing in Minority Institutions (ECMI). CCB faculty and staff members participated in ECMI conferences, sharing the experiences of CCB with other minority institutions.

## SMITHSONIAN PROJECT

CIS Department persons heard about an effort of the Washington Chapter of the Association for Computing Machinery, to assist with collection and display of equipment for the Smithsonian Institution. Certain working machines were needed for display as "working antiques" and computer persons knowledgeable about those machines were encouraged to volunteer time to establish them as working exhibits. After consultation with Dr. Uta Merzbech at the Smithsonian Institute, plans were made to transfer the IBM 1620 to their site as a donation by the College and the City of Baltimore. Several persons including alumni agreed to help with the development and maintenance of the exhibit.

## Advice

**Jim Lennon** (Manager, Computer Services):

- Allow extra time for training of personnel on new hardware and software. It is easy to be too optimistic.
- Do not be too optimistic in planning, particularly as it applies to capabilities of new enhanced software capabilities. Allow more time than apparent to complete the conversion effort.
- If the institution depends on an outside procurement agency to obtain services and goods from the marketplace, build into the installation plan an additional 4-6 months of lead time.
- Develop total cost estimates before embarking on the project; once the execution phase commences, keep accurate cost records so areas of overrun can be identified early to allow the application of remedial action.

**Joyce Little** (Computer and Information Systems Department):

- Liaison with industry is important. Can be achieved by internships, industry advisory groups, local professional societies, and alumni.
- Provide for transition from college hardware to industry hardware.
- Annual curriculum revision is needed because data processing field changes so fast.
- High level of commitment from administration is essential to secure adequate equipment and staff.
- Centralize all computer courses in one department in order to achieve a critical mass of equipment, expertise and funds.
- Computer labs using standalone (micro) computers require more effort to supervise and run than labs using timesharing terminals (primarily due to equipment complications).
- Certain students (such as welfare mothers) should be provided with take-home terminals since they cannot afford the time needed for labs at college.

- Equipment should be acquired gradually. Faculty should be given first access to new equipment and should have one terminal and one microcomputer in their offices.

**Fred Dumser** (Science Learning Center):

- Students need "friendly" learning center (helpful staff, comfortable physical environment).
- Better to develop courseware in-house so that it relates directly to courses (or build courses around existing packages).
- In assessing equipment needs and selecting vendors, it is important to visit other users with comparable environments.
- In instructional environment like CCB, where technical staff is small, it is important to have good vendor support.
- Faculty and administrators need to know who and where to go for assistance/advice.
- The use of floppy diskettes makes computing too complicated for students in SLC environment.
- Because it is almost impossible to keep good computer staff at community college salaries, consultants should be used.
- Programmers should be permanently assigned to specific applications.
- Don't try to oversell CAI or imply to administrators that CAI will replace faculty.
- Get enough money to do it right (don't try if there are too many limitations).
- Be patient.

**Isadore Stein** (Original Co-Founder of the Department)

- Maintain close contact with industry managers to be always aware of their needs and how they are changing, and to be able to receive notice of job opportunities for students.

- Maintain a quality program; students must be capable by industry standards.
- Begin by sharing computer resources with administrative users until separate facilities become feasible.

# Contacts

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Everett Jarvis, CIS Department

Sharon Stewart, CIS Department

Elinor Heath, Director of Program Evaluation

Jim Lennon, Director, Planning and Information Systems

Fred Dumser, Biology Department

Fred Lee, Chemistry Department

John Calvert, Physics Department

Bill Hammond, Vice President, Finance

Rod Fields, Dean of Faculty

Phyllis Della Vecchia, Dean of Planning and Development